

An investigation of Interaction of Saharan dust and Atlantic ITCZ using Cloudsat-Calipso and A-train data

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Abstract

In this study, we investigate the radiative forcing of Saharan dust, its interactions with the Atlantic Intertropical Convergence Zone (ITCZ), through African easterly waves (AEW), African easterly jets (AEJ), and its impacts in short term numerical forecasts of tropical cyclogenesis using the GOCART-GEOS5 forecast system. Our approach is to develop and use an A-Train satellite simulator (ATSS) to constrain the observed aerosol index of refraction and particle size distribution by finding the values that simultaneously minimize the difference between observed CALIOP, CloudSat, OMI, and MODIS radiances and simulated radiances inverted from atmospheric model output using procedures and physical principles consistent with those used in corresponding retrieval algorithms. We use observations from the A-train and TRMM to determine relationships among the Saharan dust layer, transport by the AEW, and possible responses to dust radiative forcing in developing tropical cyclones in the A-ITCZ.

Preliminary model results showing physical processes associated with the generation and transport of the Saharan dust layer, their interactions with the incipient moisture, clouds and rainfall in developing tropical cyclones will be presented. Also presented will be results of a case study of possible radiative impacts on AEW and AEJ during the NAMMA field campaign.